REVIEW PLAN

MANAHATTAN, KANSAS LEVEE – Section 216
FLOOD DAMAGE REDUCTION PROJECT -- FEASIBILITY STUDY PHASE

1. DOCUMENT OBJECTIVE. The purpose of this document is to outline the project review process in accordance with EC 1105-2-408 and provide guidance to the PDT team on the specific review levels, responsibilities, and process requirements for execution of review on the Manhattan, Kansas Levee project.

2. GENERAL INFORMATION.

Executive Summary -- Study Purpose and Background.
The U.S. Army Corps of Engineers Kansas City District along with local project sponsors, are conducting a feasibility study of the existing Manhattan Levee flood protection project. The study is authorized under Section 216 of the 1970 Flood Control Act (review of completed civil works). The Manhattan Kansas Levee Unit withstood the Flood of 1993, but some elements of the system were seriously challenged as releases from Tuttle Creek Dam (which lies just upstream on the Big Blue River) created a near overtopping situation at some locations along the Big Blue River levee segment. This event raised a concern that the levees may provide less than the level of protection for which they were designed.

This feasibility study will update and verify data on the level of flood protection provided by the local flood damage reduction project, and if warranted, will develop alternative plans for increasing the reliability of the existing system. Such plans will be technically viable, economically feasible and environmentally acceptable.

Study Authority. Section 216 of the 1970 Flood Control Act provides authority to reexamine completed civil works. Section 216 reads as follows:

> *The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects, the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to the significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying structures or their operation, and for improving the quality of the environment in the overall public interest.*

Original Project Authority
The original Manhattan, Kansas levee project was authorized by the Flood Control Act approved 3 September 1954 (Title II, Public Law 780, 83d Cong., 2d Sess., H.R. 9859).

Feasibility Study Objectives
The Kansas City District is undertaking this feasibility study with the following objectives:
1. adequately evaluate the reliability/performance of the existing Manhattan levee unit,
2. formulate plans for increasing the levee unit reliability through a cost-shared construction project, and if such plans are deemed feasible, then
3. develop the documentation necessary to seek project authorization and implementation.

Summary Study Scope and Execution Parameters.
The Project Management Plan for this study is based on a two-phase approach to performing the feasibility study.
- Feasibility Phase 1 will focus on refining knowledge of study area problems and a characterization of the existing condition of the levee unit with an emphasis on reliability quantification and an approximate determination of potential economic damages from various types of levee failure.
- Feasibility Phase 2 will focus on: a more detailed and accurate assessment of existing conditions economic damages, generating reliability improvement options array, development and costing of concept designs for implementation of such recommendations, overall plan formulation and evaluation, and the preparation of decision documents necessary for review and authorization of any proposed project.

While it is the intent of all parties to proceed through the entire feasibility process, a formal checkpoint will occur after the essential completion of the Phase 1 study and associated ITR, whereby the Kansas City District PDT and Planning Branch Management, the ITR team leader and the Sponsor will perform a detailed joint examination of the Phase 1 results to date, review current costs in detail, and perform a verification of both Federal and sponsor interest in proceeding into feasibility Phase 2. If warranted, the PMP study scope, estimated cost, and schedule may be updated at this checkpoint.

Local Sponsorship and Funding.
Feasibility funding source is 50% Federal General Investigations (GI) -- Civil Works Appropriation & 50% local cost share funding. All local funding will be provided from the City of Manhattan, Kansas who owns and operate the Manhattan Levee unit. The City of Manhattan signed an FCSA with the Corps in Nov 2005.

Description of Existing Overall Project and Problem. The existing Manhattan, Kansas levee unit consists of 28,841 feet of levee, plus 4,100 feet of channel improvement for the Kansas River, the modification of a Rock Island (now Union Pacific) railroad bridge, six pressure relief wells, and two active pumping plants for flood protection of Manhattan, Kansas from floods on the Big Blue and Kansas Rivers. Construction of the project was initiated on 4 May 1961 and the completed project was transferred to local interests for operation and maintenance in July 1963.

The levee system is located in/around the City of Manhattan, KS (see enclosure 1 and 2 for levee system site plan and description details). Manhattan, the seat of Riley County, has an area of about 16 square miles. The 2000 population stood at 44,831, which represented an impressive growth of nearly 19 percent over the 1990 population of 37,712. The city is the ninth-largest in Kansas. The broader Riley County area had a 2000 population of 62,843. The community is dominated by two public institutions: Kansas State University, with about 22,000 students and 3,000 employees, and the U.S. Army's Fort Riley (just west of the city) with a base population of more than 8,000. The number of active duty personnel at Fort Riley is expected to increase substantially given recent Congressional BRAC recommendations. This will in turn increase the surrounding civilian population. Manhattan is also the primary service and retail center for a three-county area of more than 100,000 people.

The town is situated along U.S. Highway 24, which links the area to Kansas City (about 125 miles to the east), and is also served by state routes 18 and 177 which link the area to Interstates 70 and 135. The Corps of Engineers Tuttle Creek Lake is situated to the north of Manhattan (see enclosure 3 and 4 for plans and description). Tuttle Creek is a major lake in the Kansas River basin system of flood control lakes.

The urban Manhattan floodplain includes a centrally located downtown and commercial area (which includes a major regional shopping mall), neighborhoods generally to the west of the downtown area, and a light industrial area comprising the eastern half of the study area. The study area contains more than 1,500 homes and roughly 500 businesses and public facilities. The estimated value of these homes and businesses, based on reconnaissance-level data, is more than $600 million.

This study was triggered by an incident in July of 1993. With approx. 60,000 cfs released from Tuttle Creek reservoir, and approx. 100,000 cfs flowing in the Kansas River, some problems related to potential overtopping were indicated along the Big Blue River section of the Manhattan levee system. The design documentation for the Manhattan levee describes a system designed for a significantly higher coincident flow regime than was experienced in 1993. Mr. Allen Tool, currently of Chief, Kansas City District H&H Branch was in Manhattan during the 1993 event conducting surveillance for the Corps and has verified the need for review of the system performance.

During the last decade, the local community (City of Manhattan) has undertaken a series of actions including engineering studies to characterize the potential overtopping threat posed under similar and higher discharge events. Those recent local efforts have produced a digital hydraulic model (Flood Predictive Model) that indicates much lower levels of flood protection than the original Corps design documentation.

The Corps undertook a reconnaissance study at the request of the City and performed most of the reconnaissance investigation in the 2003 to 2004 timeframe. The subsequent 905B document was approved in Nov 2004 by CENWD for progress into feasibility subject to FCSA execution and Federal funding. An FCSA was executed with the sponsor in Nov 2005.

3. LEVELS OF REVIEW

Internal Peer Review (IPR) – Internal Peer Review will be conducted on the project feasibility study. As part of the Quality Management Plan on any project, there are internal reviews or design checks that constitute quality control for each deliverable product. It is the responsibility of each product development team member, their supervisors, and the project manager to ensure that every product receives an internal quality control review. It is the responsibility of the supervisor or section chief for each team member to ensure that a qualified internal peer review is selected and conducts a review of their product prior to delivery to the project manager, or prior to completion.

Independent Technical Review (ITR) – Independent Technical Review will be conducted on the Manhattan Levee feasibility study. Independent Technical Review is an independent review, outside of Kansas City District, of the deliverables for the project and constitutes an independent review of the entire project. In accordance with EC 1105-2-408 dated 31 May 2005, and CECW-CP Memorandum dated 8 November 2006, all outside independent review teams for qualifying projects is coordinated through the Corps of Engineers' Flood Damage Reduction Center of Expertise (CX, South Pacific Division) by the District. The CX works collaboratively with the Division staff and the District project manager to find team member staff outside the Kansas City District with the requisite experience and qualifications to review the project. Review comments will be documented, processed, and resolved through the Dr. Checks software package.

External Peer Review (EPR) – External Peer Review **(**EPR) does not apply to the Manhattan Levee project and will not be conducted. EPR is an additional national level independent review process, outside the Corps of Engineers, to ensure that the projects are of national or regional interest and meet the requirements of Federal participation. Specific criteria that trigger the development and implementation of EPR are projects where novel methods are utilized, where the project presents complex challenges, where the use of precedent setting methods or models, where the project will be likely to present landmark conclusions that will affect policy, or where the project is centered or focused on an issue or proposal that is highly controversial.

The Manhattan Levee project is an evaluation of the condition and performance of an existing levee system. There are currently no features or components of this project that are anticipated to be highly controversial or significant to national policy. The anticipated overall cost of the project is considered to be well below any threshold that might trigger EPR under any future provisions of the Water Resources Development Act (WRDA). In the proposed evaluation of the Manhattan levees, Corps of Engineers criteria, methods, and models to be utilized are recognized standard criteria and methods with no novel or precedent setting methods anticipated. Based on the proposed levee evaluation project plan and the criteria established for development of EPR, no External Peer Review process will be developed for this project.

Architect-Engineer (A-E) or Consulting Contacts - Contracts used on this project will undergo a Quality Assurance Review of each deliverable product by assigned District PDT members. Additionally, any products developed by contract will also undergo ITR along with other products as outlined in the ITR paragraph above. All contractors are required to develop a Quality Management Plan to be submitted as the first deliverable for the contract. This will

detail the firm's internal quality management and design check review processes, and is subject to prior approval by the Project Manager and PDT in accordance with the established Kansas City District Business Quality Procedures.

4. SELECTED REVEW PROCESS(S)

The selected review process level for the Manhattan Levee project is the Independent Technical Review. The ITR will be developed in coordination with the CX for Flood Damage Reduction, and the CX representative Mr. Roger Setters. This process will be coordinated through the Northwestern Division Planning Office. Internal peer review (IPR) or internal design checks will be conducted in accordance with the approved District Business Practices, as outlined above. It is anticipated that A-E contracts will be utilized for development of technical products for this project. Contracts will be procured in accordance with the prior approval of the District Acquisition Strategy Board, as outlined in the approved District Business Quality Procedures.

ITR References:

- Refer to ER 1110-1-105, the primary Corps ITR regulation (see enclosed exhibit for summary of the major ITR requirements described in this regulation).

- EC 1105-2-408 dated 31 May 2005

- CECW-CP Memoranda dated 8 November 2006 and 30 March 2007.

- Refer to Kansas City District Business Quality Procedure (BQP) 5.5.04 (Quality Plans). Pertinent excerpts are quoted below:

5.6 ITRT Members:

- *Verify compliance with established policy, principles and procedures.*
- *Verify criteria applied.*
- *Verify assumptions, methods, procedures, and material used in analyses.*
- *Evaluate alternatives.*
- *Verify the appropriateness of data used and level of data obtained.*
- *Verify completeness of design and documents.*
- *Verify reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.*
- *Conduct spot checks for interdisciplinary coordination.*
- *Identify the specialized knowledge, experience, or training required to competently complete the product.*
- *Verify comments are resolved by:*
  - *Verifying incorporation of their comments or,*
  - *Accepting the verification conducted by ei*ther the PM or ITRT Leader or,
  - Withdrawing the comment.

6.1.7.7.3 Independent Technical Review: Qualified staff verifies the work meets reasonable professional levels and satisfies the client's needs and expectations. For small, simple, low complexity, low risk projects, independent technical review can be accomplished at the section level. Independent technical review can be managed at branch levels when a few disciplines are involved, the project is of moderate cost and complexity and the risk for life safety is relatively low. Independent technical review for all other

projects should include individuals who do not have a vested interest in the project and are not involved in the day-to-day direction of the product. The PMP should define the level of independent technical review. Independent technical review is not a detailed check but a broad overview including:

- *Review of criteria applied,*
- *Review of the methods of analysis and design,*
- *Compliance with client and/or program requirements,*
- *Completeness of design and documents,*
- *Spot checks for interdisciplinary coordination,*
- *Biddability, constructability, operability and environmental.*

6.1.7.7.4 Independent reviewers are brought on board early on to participate in establishing criteria selection and broad approaches to be taken in addressing potential issues thus ensuring seamless review.

- Independent Reviewers are required to use the Dr Checks web-based system for developing, processing, and resolving review comments or issues.

5. PRIMARY DISCIPLINES AND EXPERTISE NEEDED FOR THE ITR

Discipline-Specific Guidance & Requirements. ITR Team representation is required in the disciplines listed below. A statement of qualifications is required for each team member prior to acceptance as an ITR Team member and for any subsequent changes thereto.

Hydrology & Hydraulics: Team member will be an expert in the field of large-river hydrology & hydraulics, have a through understanding of the dynamics of the confluence of two rivers, and be familiar with interior drainage issues related to levee construction. The team member will have an understanding of computer modeling techniques that will be used for this project (HEC-HMS, HEC-RAS, UNET, and TABS).

Structural: Team member will have a thorough understanding of levee , flood wall, and retaining wall design, and structures typically associated with levees (pump stations, gatewell structures, utility penetrations, stoplog & sandbag gaps, and other closure structures).

Mechanical: Team member shall be familiar with levee pump station and closure structure design. *Engineering disciplines other than Mechanical may be acceptable for review of this area of work subject to meeting the experience requirement stated above.*

Electrical *(if deemed necessary)* : Team member shall be familiar with levee pump station and electrical utilities design. Electrical ITR requirements for this study are very minimal.

Geotechnical: Team member will have extensive experience in levee & floodwall design, post-construction evaluation, and rehabilitation. Very critical ITR team member

Economics: Team member will have extensive experience in related flood damage reduction projects, and have a thorough understanding of HEC-FDA.

Formulation: Team member will be familiar with current flood damage reduction planning and policy guidance, and have experience in plan formulation for large-scale flood damage reduction projects.

Civil / Site / Utilities / Relocations: This requirement may require a dedicated team member, or may be satisfied by structural or geotechnical reviewer, depending on individual qualifications. Team member will have experience in utility relocations and positive closure requirements for levee construction.

Cost Estimating: Team member will be familiar with cost estimating for similar projects using MCACES. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer.

Other disciplines/functions involved in the project include Hazardous/Toxic Waste, Environmental/NEPA, Real Estate, Cultural Resources, and Legal. In each case, any required Independent Technical Review within these disciplines may be accomplished within Kansas City District or by other independent sources. The general experience requirements and principles contained in this document also apply to these disciplines/functional areas. *(Exception: Legal review is not under the purview of the ITR Team Leader but is instead responsible to the Corps of Engineers Ofc of Counsel chain-of-command).*

ITR Team Leader. One member of the ITR Team will act as the ITR team leader. Team leader designation will be finalized based on input from ITR Team members and the CENWK Project Manager, the PDT, and CENWK staff. The ITR leader shall, in addition to discipline-specific review requirements, be responsible for:

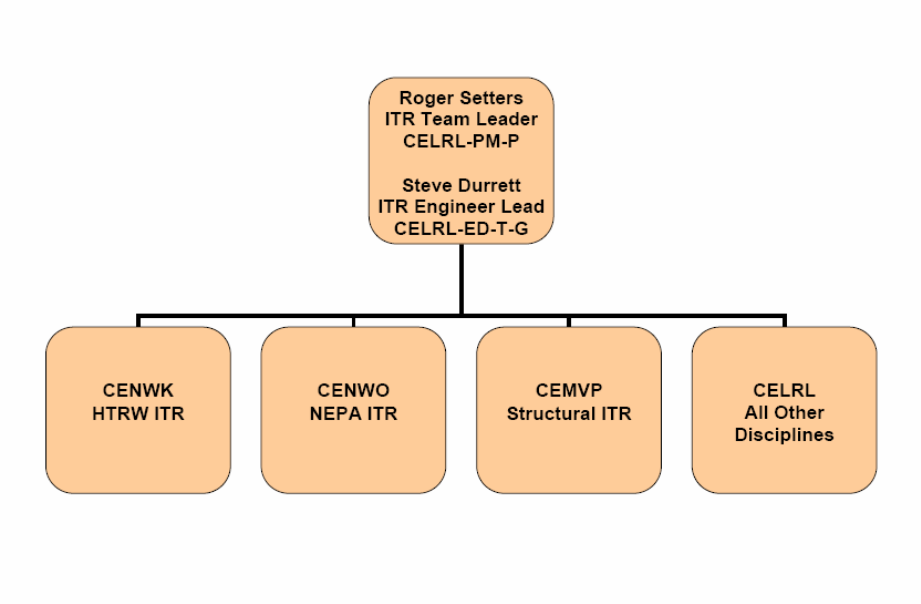
- Acting as a liaison between the Product Development Team and the ITR Team
- In conjunction with the PM, the ITR team leader will perform active coordination of the ITR process and study findings with the Corps Flood Damage Center Expertise (FDX) in San Francisco District, and ensure compliance with an adequate level of FDX review.
- Distributing information for review and coordinating efforts of the ITR Team.
- Ensuring that individual ITR Team members are operating IAW the guidelines established for ITR by ER 1110-1-105 (see enclosed exhibit for summary of the major ITR requirements described in this regulation).
- The ITR team is *not* geographically co-located. Therefore, it is of paramount importance that the ITR Team Leader be capable of organizing the total ITR efforts across District and Division boundaries.
- A substitute ITR Team Leader from the ITR team will be named by the ITR team leader for periods of extended (over 60 days) absence.

Independent Technical Review Team Members and Organization

The ITR team membership and ITR team organization for the Manhattan feasibility study will essentially remain intact from a previous established Kansas Citys Levees feasibility study members. This has the major advantage of keeping experienced and approved reviewers in-place. Team membership may change as the study progresses, but key ITR team members are

expected to remain relatively stable. ***The ITR Team leader is Roger Setters of CELRL Planning, and senior member of the Corps FDX.***

Organization of the Manhattan ITR Team is displayed below:



The ITR team members will be contacted on a regular basis by the corresponding PDT members so as to be kept aware of criteria selection and the broad approaches employed in this study thus ensuring a seamless review when products are submitted for ITR.

6. ITR SCHEDULE. The feasibility phase was initiated in November 2005. The Feasibility phase schedule continues to be impacted by constrained levels of Federal funding, and received limited funding in FY 2006. Federal funds have been allocated in April 2007 and the feasibility study was reinitiated after being on hold for lack of funds since December 2006.

ITR Team Site Visit. An initial site visit is required and will be schedule at some point within the existing conditions review and analysis period. The site visit timing is subject to adequate project funding and adequate establishment and availability of the ITR team. This site visit will provide each reviewer with the opportunity to view existing conditions and to meet corresponding Product Development Team members.

Phase I Schedule. The Existing Conditions (EC) development (also called Feasibility Phase 1) is to be accomplished Nov 2005 to Sep 2008 (SAF). ITR of the existing conditions findings and associated analysis products (which are primarily engineering related analysis supplemented with some HTRW, Real Estate, and Environmental baseline conditions documentation) will follow immediately thereafter. The Phase 1 ITR timeframe will be coordinated with the ITR review team as the review time approaches.

Phase II Schedule. Anticipated milestones related to Phase 2 (Future Conditions and Alternatives Formulation and Development) activities and associated Feasibility Report (draft and final) product reviews are as follows (subject to change):

- Sep 2009: Complete draft Engineering Appendix and fwd to ITR review
- Dec 2009: Complete draft Engineering Appendix ITR and resolution of comments
- Mar 2010: Complete draft main Feasibility Report, HTRW, Econ, & RE Appendices & draft EIS for ITR.
- Jun 2010: Hold AFB review with NWD, HQUSACE, selected ITR staff, and sponsors.
- Late 2010 - early 2011: depending on HQUSACE PGM and policy guidance timeframe, and the CWRB recommendations, a final feasibility report, EIS, and all appendices should be available for final ITR review in mid-2011.
- Complete feasibility and begin authorization process in 2011.

7. ITR BUDGET

ITR is currently budgeted at $50,000 to $60,000 total for the:

- initial ITR team site visit,
- formal ITR reviews at the: Existing Conditions documentation checkpoint; pre-AFB submission of the Draft Feasibility Report, EIS and all appendices; and the Final Feasibility Report, EIS and all appendices,
- plus all associated interim coordination and consultations.

Note that the final ITR budget is dependent on the number and quantity of the areas of interest (those areas which are viable candidates for potential Federal project formulation efforts) developed during the feasibility study.

8. PUBLIC COMMENT OPPORTUNITIES

Review of the project review plan will be available on the Kansas City District Manhattan Feasibility Project website, and at the request of interested parties.

Public and Agency Review for this project will be conducted in accordance with NEPA, as well as the provisions of the Water Resources Development Act (WRDA) 2000, and as outlined in ER 1105-2-100. As such the review plan will be available through all public and agency scoping and other processes for the project

9. AVAILABILITY OF PUBLIC COMMENTS TO REVIEW TEAM

Public input from the NEPA workshops and the public scoping meetings will be available to the ITR members to ensure that public comments have been considered in the development of reviews and final reports.